IN THE DRAWINGS

The attached replacement drawing sheet 1/3 includes changes to FIGS. 1 and 2. The replacement sheet replaces the original sheet 1/3, and is accompanied by an annotated sheet showing the changes in red. In the figures, the thicknesses of the lines depicting the measurement electrode 14, the reference electrode 16 and the working electrode 36 have been increased to distinguish them from the electrolyte 12 over which they are drawn. In addition, the lead line indicating the electrolyte 12 has been repositioned to more clearly distinguish the electrolyte from the electrodes.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

REMARKS

This Amendment is in response to the Office Action mailed September 4, 2007. The Examiner set a shortened statutory period for reply of three (3) months, making the present Amendment due by December 4, 2007. The application became unintentionally abandoned on March 5, 2008 and a Notice of Abandonment was mailed by the Patent Office on May 16, 2008. This Amendment is accompanied by a Petition under 37 C.F.R. § 137(b) to revive an unintentionally abandoned application, together with the appropriate fee.

In the present paper, claims 1, 6, 8, 14 and 17 are amended and claims 7, 9, 10, 16, 18 and 19 are canceled. Claims 1-6, 8, 11-15, 17 and 20 are now presented for the Examiner's consideration.

Drawings

In the official action, the Examiner has objected to FIGS. 1 & 2 because the thicknesses of the lines depicting the measurement electrode 14, the reference electrode 16 and the working electrode 36 were said to be insufficient to distinguish the electrodes from the electrolyte 12 over which the electrodes are drawn. The lines representing the electrodes have been thickened to clearly distinguish the electrodes from the underlying electrolyte. In addition, the lead line indicating the electrolyte 12 has been repositioned to more clearly distinguish the electrolyte from the electrodes.

A replacement drawing sheet and an annotated sheet showing the changes are attached. Applicants submit that the drawing changes fully address the Examiner's drawing objections.

Claim Objections

In the official action, the Examiner objected to claim 14 as containing an informality. Claim 14 has been amended as suggested by the Examiner, and Applicants submit that the objection is thereby overcome.

Claim Rejections under 35 U.S.C. § 112, second paragraph

Claims 6-10 and 16-19 have been rejected as indefinite.

Claim 6 has been rejected as indefinite because it contains the phrases "typically" and "such as." That claim has been amended to delete those phrases, and the listed compositions of the solid state source of oxygen have been included in a Markush group. Applicants submit that claim 6 now meets the definiteness requirement of 35 U.S.C. § 112, second paragraph.

As to *claim 7*, the Examiner alleges that it is unclear what is meant by the phrase "means for controlling the oxygen electrochemical semi-permeability of the cell so as to control the sensitivity of the sensor to the introduction of the organic contaminant molecules." Claim 7 has been canceled, and claim 1 has been amended to include the phrase "means for controlling oxygen electrochemical semi-permeability of the cell." Applicants assert that that limitation is clear on its face, and the terms are fully described in the specification. For example, oxygen electrochemical semi-permeability is defined at least at page 7, lines 22-30 of the present specification. Applicants furthermore assert that the limitation is a means-plus-function limitation as explicitly permitted under 35 U.S.C. § 112, sixth paragraph. Several examples of such "means for controlling" are described in the specification at least at page 8, lines 2-18.

As to *claim 8*, the Examiner states that it is unclear what is meant in that claim by the limitation "means for controlling the rate of flux of oxygen anions flowing between the additional electrode and the measurement electrode." That phrase has been deleted from claim 8, and replaced by a limitation from claim 9. Claim 9 been canceled. Applicant asserts that claim 8 now meets the definiteness requirements of 35 U.S.C. § 112, second paragraph.

The Examiner has also rejected *claims 9 & 10* under section 112, second paragraph, as depending from the rejected claims. Those claims have been canceled.

As to *claims 16-19*, those claims were rejected on section 112 grounds corresponding to those upon which claims 7-10 were rejected. Claims 16, 18 & 19 have been canceled and claims 14 & 17 have been amended in a manner similar to that discussed above with reference to claims 1 & 8. Claims 14 and 17 are therefore submitted to meet the definiteness requirement of 35 U.S.C. § 112, second paragraph.

Applicants therefore assert that the Examiner's rejections of claims 6-10 and 16-19 based on the definiteness requirements of 35 U.S.C. § 112, second paragraph, are therefore overcome.

Claim Rejections Based on Prior Art

The Examiner has rejected claims 1, 2, 4 & 5 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent Publication No. 2003/0062264 to Kitanoya et al. ("Kitanoya"). The Examiner has rejected all other claims under 35 U.S.C. § 103(a) as being unpatentable over Kitanoya in view of various secondary references and their combinations. For example, claim 10 has been rejected as being unpatentable over Kitanoya in view of U.S. Patent No. 6,551,497 to Gao et al. ("Gao"), and claim 19 has been rejected as being unpatentable over Kitanoya in view of U.S. Patent No. 5,889,196 to Ueno et al ("Ueno") and further in view of Gao.

Regarding independent *claim 1*, Applicants have incorporated the limitations of claim 10, including a portion of the limitations of intervening claim 7 as discussed above, into claim 1. Applicants assert that claim 1, as amended, is patentable over the art cited by the Examiner at least because the cited art does not teach or suggest a "means for controlling the concentration of oxygen within the reference environment."

The sensor of the invention includes a measurement electrode for exposure to a monitored environment, and a reference electrode for exposure to a reference environment. The measurement electrode and the reference electrode are separated by a solid state anion conductor through which oxygen anions may be transported.

Claim 10, now incorporated into claim 1, required a "means for controlling the concentration of oxygen within the reference environment." The oxygen electrochemical semi-permeability of the cell causes poor sensor performance at low oxygen partial pressures because transported oxygen anions swamp the monitored environment (present specification at page 7, lines 22-30). The inventors have discovered that the oxygen electrochemical semi-permeability of the cell may be controlled by controlling the concentration of oxygen within the *reference* environment (page 8, lines 12-16).

In rejecting claim 10, the Examiner has alleged that Gao teaches a means for controlling the concentration of oxygen within the reference environment. Specifically, the Examiner points to passages in Gao at col. 3, lines 20-44, and at col. 7, lines 20-33, as teaching that limitation. Applicants respectfully disagree.

The oxygen concentration controlled by Gao is the oxygen concentration in the measurement chamber, and not the oxygen concentration in the reference chamber as required by amended claim 1. As clearly stated by Gao in the passage identified by the Examiner, and as

clearly shown in FIG. 7, the oxygen sensing electrode 46, its counter-electrode 45 and the oxygen pumping electrodes 48, 47 are all placed in the *measurement* chamber 18 (sic, should be 38) (Gao at col. 7, lines 20-33). Gao explicitly states:

> The concentration of oxygen *in the measurement chamber* 18 is detected using the oxygen sensing electrode and the voltage applied to the oxygen pumps is adjusted based upon the electromotive force obtained, thereby varying the amount of intake or discharge of oxygen so that the oxygen concentration is controlled to a constant value.

Gao at col. 7, lines 28-33 (emphasis added).

Gao controls oxygen concentration in the NO_x mixture to be detected in order to minimize changes in oxidation or reduction of oxygen in that gas:

> Since the polarized electrode potential changes and NO_x concentration cannot be detected accurately owing to oxidation or reduction of oxygen *in the gas to be detected*, it is required that the oxygen concentration be controlled so as to be rendered constant. Further, the catalytic function of the electrodes also varies depending upon a difference in electrode material, and a disparity in sensitivities to NO and NO_2 can be expected as well. Accordingly, it is desired that *the oxygen concentration and the NO:NO_2 ratio in the gas to be detected* be rendered constant to the maximum degree possible.

Gao at col. 7, lines 10-20 (emphasis added).

In contrast to the manipulation of the gas *to be detected* by Gao, the inventors have found that controlling oxygen concentration in the *reference* chamber controls the oxygen electrochemical semi-permeability of the cell and therefore enhances sensor response.

No reference cited by the Examiner teaches or suggests the control of oxygen concentration within the reference environment. Applicants therefore submit that claim 1, as amended, is both novel and non-obvious over Kitanoya in view of Gao, and all other known art. *Claims 2-6, 8 and 11-13*, which depend from claim 1, are also submitted to be patentable over the cited art for at least the same reasons as claim 1.

Claim 14 has been amended to incorporate the limitations of claim 19, and now requires "controlling the oxygen electrochemical semi-permeability of the cell by controlling the concentration of oxygen within the reference environment." Applicants assert that claim 14 is patentable for the same reasons discussed above with reference to claim 1, and that dependent

claims 15, 17 and 20, which depend from claim 14, are also patentable for at least the same reasons.

Conclusion

Applicants therefore assert that pending claims 1-6, 8, 11-15, 17 and 20 are in condition for allowance, and earnestly request that the Examiner issue a Notice of Allowance.

Should the Examiner have any questions regarding the present case, the Examiner should not hesitate in contacting the undersigned at the number provided below.

Respectfully submitted,

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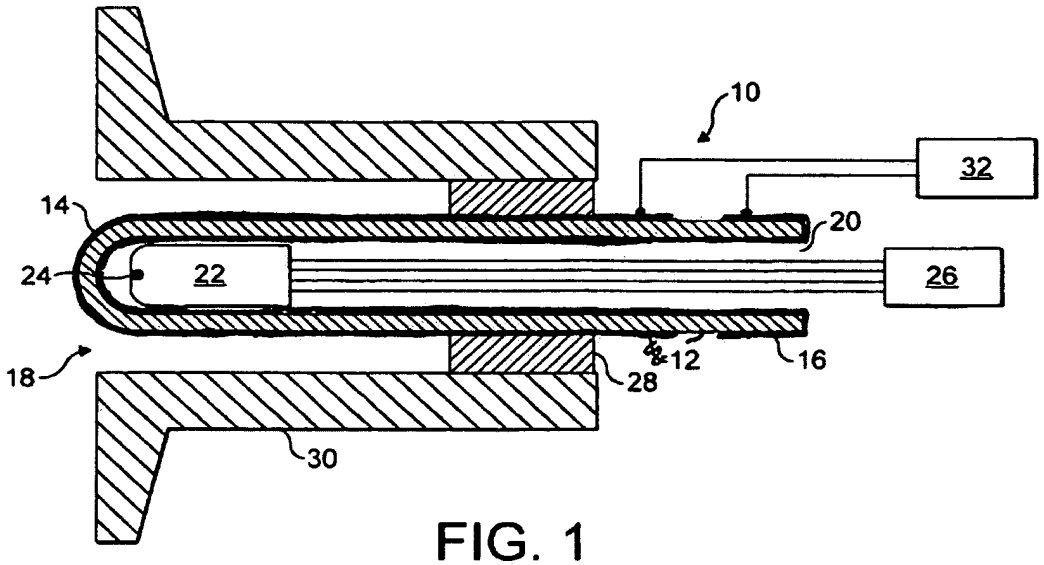
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FIG. 1

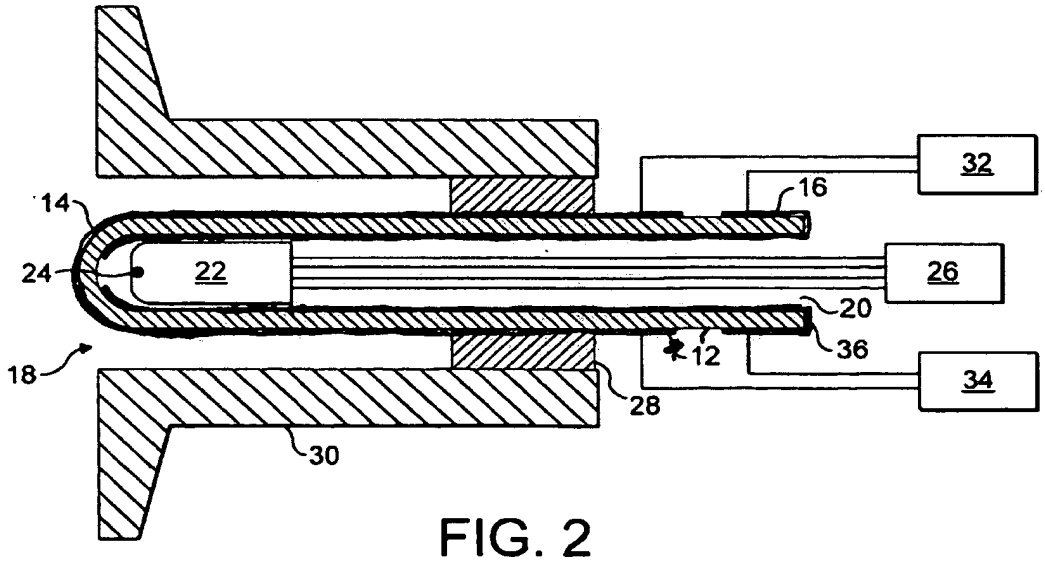
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FIG. 2